



DIVISION SEMICONDUCTEURS

59C 02690 D T-11-23  
ICTE 5S, C → ICTE 45, CUNI — AND BIDIRECTIONAL TRANSIENT VOLTAGE SUPPRESSORS  
DIODES DE PROTECTION UNI — ET BIDIRECTIONNELLES

## TRANSIL

TRANSIENT VOLTAGE SUPPRESSOR DIODES ESPECIALLY  
USEFUL IN PROTECTING INTEGRATED CIRCUITS, MOS,  
HYBRIDS AND OTHER VOLTAGE-SENSITIVE SEMICON-  
DUCTORS AND COMPONENTS

- HIGH SURGE CAPABILITY : 1,5 kW/1 ms expo.  
18 kW/8-20  $\mu$ s expo.
- VERY FAST CLAMPING TIME : 1 ps for unidirectional types  
5 ns for bidirectional types
- LARGE VOLTAGE RANGE : 5V → 45V

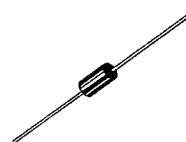
DIODES ECRETEUSES ADAPTEES A LA PROTECTION DES  
CIRCUITS INTEGRES, MOS, CIRCUITS HYBRIDES, AUTRES  
SEMICONDUCTEURS ET COMPOSANTS SENSIBLES AUX  
SURTENSIONS.

- GRANDE CAPACITE DE SURCHARGE : 1,5 kW/1 ms expo.  
18 kW/8-20  $\mu$ s expo.
- TEMPS D'ECRETAGE TRES RAPIDE :  
1 ps pour types unidirectionnels  
5 ns pour types bidirectionnels
- GAMME DE TENSION ETENDUE : 5V → 45V

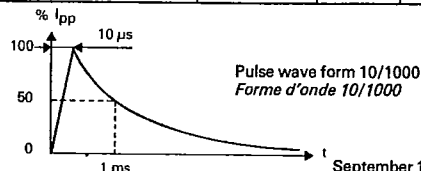
 $P_p$  : 1,5 kW/1 ms expo.  
18 kW/8-20  $\mu$ s expo. $V_{RM}$  : 5V → 45V

Type number → Unidirectional types

Type number + suffix C → Bidirectional types

Case : CB-429 plastic  
Boîtier : note 2ABSOLUTE RATINGS (LIMITING VALUES)  
VALEURS LIMITEES ABSOLUES D'UTILISATION

|   |                                     |                    |                   |          |
|---|-------------------------------------|--------------------|-------------------|----------|
| Peak pulse power for 1 ms exponential pulse<br>Puissance de crête pour une onde exponentielle de 1 ms   | $T_J$ initial = 25°C<br>(cf note 1) | $P_p$              | 1,5               | kW       |
| Power dissipation on infinite heatsink<br>Dissipation de puissance sur radiateur infini   | $T_{amb}$ = 75°C                    | P                  | 5                 | W        |
| Non repetitive surge peak forward current for unidirectional types<br>Courant direct non répétitif de surcharge accidentelle<br>pour types unidirectionnels | $T_J$ initial = 25°C<br>t = 10 ms   | $I_{FSM}$          | 250               | A        |
| Storage and junction temperatures<br>Températures de jonction et de stockage  |                                     | $T_J$<br>$T_{stg}$ | 175<br>-65 → +175 | °C<br>°C |
| Maximum lead temperature for soldering during 10 s at 4 mm from case<br>Température maximum de soudure des connexions pendant 10 s à 4 mm du boîtier        |                                     | $T_L$              | 230               | °C       |

Junction - connexions thermal resistance on infinite heatsink ( $L_{lead}$  = 10 mm)  
Résistance thermique jonction - connexions sur radiateur infini ( $L_{connex.}$  = 10 mm) $R_{th(j-c)}$  20 °C/WNote 1 : For surges upper than the maximum values, the diode  
will present a short-circuit anode-cathode.Pour des surcharges supérieures aux valeurs maximales, la  
diode présentera un court-circuit anode-cathode.Note 2 : Please consult us for types in DO 13 case.  
Nous consulter pour version en boîtier DO 13.50, rue Jean-Pierre Timbaud - B.P. 5  
F - 92403 Courbevoie Cedex FRANCE  
Tél. : (1) 788-50-01 Telex : 610560 F

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September 1983 - 1/4  
THOMSON  
COMPOSANTS

ICTE5S, C → ICTL 40, 4

59C 02691

D T-11-23

ELECTRICAL CHARACTERISTICS  
CARACTERISTIQUES ELECTRIQUESStand-off voltage :  $V_{RM}$   
Tension de veille :  $V_{RM}$ Peak pulse current :  $I_{pp}$   
Courant de crête :  $I_{pp}$ Breakdown voltage :  $V_{(BR)}$   
Tension d'avalanche :  $V_{(BR)}$ Temperature coefficient of  $V_{(BR)}$  :  $\alpha T$   
Coefficient de température de  $V_{(BR)}$  :  $\alpha T$ Clamping voltage :  $V_{(CL)}$   
Tension d'écrêtage :  $V_{(CL)}$ Capacitance :  $C$   
Capacité :  $C$ Clamping time (0 Volt to  $V_{(BR)}$ ) :  $t_{clamping} < 1$  ps for unidirectional types  
Temps de réponse (0 Volt à  $V_{(BR)}$ ) :  $t_{clamping} < 5$  ns for bidirectional types

| Types          |               | $I_{RM}$ @ $V_{RM}$ |     | $V_{(BR)}^*$ @ $I_R$ |      | $V_{(CL)}$ @ $I_{pp}$ |     | $V_{(CL)}$ @ $I_{pp}$ |     | $I_{pp}$ max | $I_{pp}$ max      | $\alpha T$ max          | $C^{**}$ typ             |
|----------------|---------------|---------------------|-----|----------------------|------|-----------------------|-----|-----------------------|-----|--------------|-------------------|-------------------------|--------------------------|
|                |               |                     |     | min                  |      | max                   |     | max                   |     | 1 ms expo    | 8-20 $\mu$ s expo |                         | $V_R = 0$<br>$f = 1$ MHz |
| Unidirectional | Bidirectional | ( $\mu$ A)          | (V) | (V)                  | (mA) | (V)                   | (A) | (V)                   | (A) | (A)          | (A)               | ( $10^{-4}/^{\circ}C$ ) | (pF)                     |
| ICTE 5S        | ICTE 5 SC     | 300                 | 5   | 5,5                  | 1    | 6,6                   | 1   | 6,9                   | 10  | 170          | 1570              | 5,7                     | 26000                    |
| ICTE 5         | ICTE 5 C      | 300                 | 5   | 6,0                  | 1    | 7,1                   | 1   | 7,5                   | 10  | 160          | 1340              | 5,7                     | 22000                    |
| ICTE 8         | ICTE 8 C      | 25                  | 8   | 9,4                  | 1    | 11,3                  | 1   | 11,5                  | 10  | 100          | 920               | 7,3                     | 13000                    |
| ICTE 10        | ICTE 10 C     | 2                   | 10  | 11,7                 | 1    | 13,7                  | 1   | 14,1                  | 10  | 90           | 830               | 8,1                     | 8800                     |
| ICTE 12        | ICTE 12 C     | 2                   | 12  | 14,1                 | 1    | 16,1                  | 1   | 16,5                  | 10  | 70           | 630               | 8,4                     | 7800                     |
| ICTE 15        | ICTE 15 C     | 2                   | 15  | 17,6                 | 1    | 20,1                  | 1   | 20,6                  | 10  | 60           | 550               | 8,8                     | 6200                     |
| ICTE 18        | ICTE 18 C     | 2                   | 18  | 21,2                 | 1    | 24,2                  | 1   | 25,2                  | 10  | 50           | 440               | 9,4                     | 4600                     |
| ICTE 22        | ICTE 22 C     | 2                   | 22  | 25,9                 | 1    | 29,8                  | 1   | 32,0                  | 10  | 40           | 360               | 9,6                     | 4200                     |
| ICTE 36        | ICTE 36 C     | 2                   | 36  | 42,4                 | 1    | 50,6                  | 1   | 54,3                  | 10  | 23           | 230               | 10,1                    | 2200                     |
| ICTE 45        | ICTE 45 C     | 2                   | 45  | 52,9                 | 1    | 63,3                  | 1   | 70,0                  | 10  | 19           | 170               | 10,3                    | 1850                     |

\* Pulse test

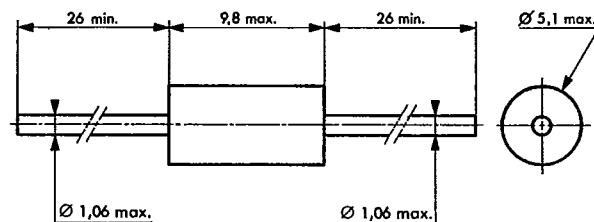
Mesure en impulsion  $t_p \leq 50$  ms  $\delta < 2\%$ 

\*\* Divide these values by 2 for bidirectional types

Diviser ces valeurs par 2 pour les types bidirectionnels

For bidirectional types, electrical characteristics apply in both directions.

Pour les types bidirectionnels, les caractéristiques électriques sont applicables dans les 2 sens.

CASE DESCRIPTION  
DESCRIPTION DU BOITIER

Cooling method : by convection (method A)

Mode de refroidissement : par convection (mode A)

Marking : type number ; white band indicates cathode for unidirectional types

Marquage : n° de type ; anneau blanc côté cathode pour les types unidirectionnels.

Weight : 0,9 g

Poids

ICTE 5S, C → ICTE 45, C

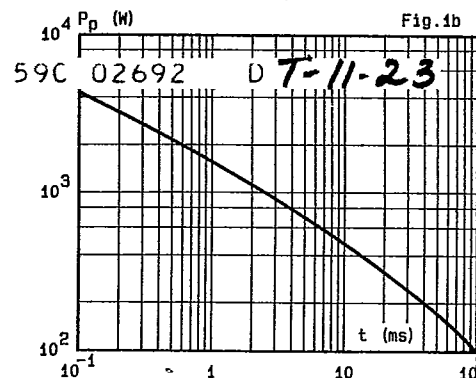
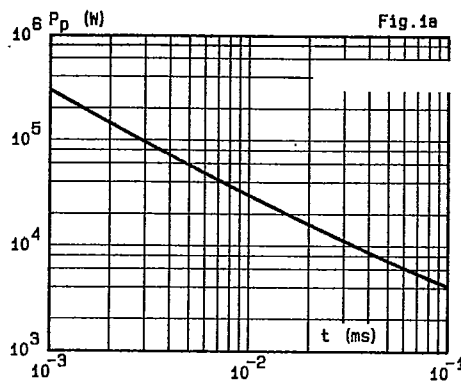
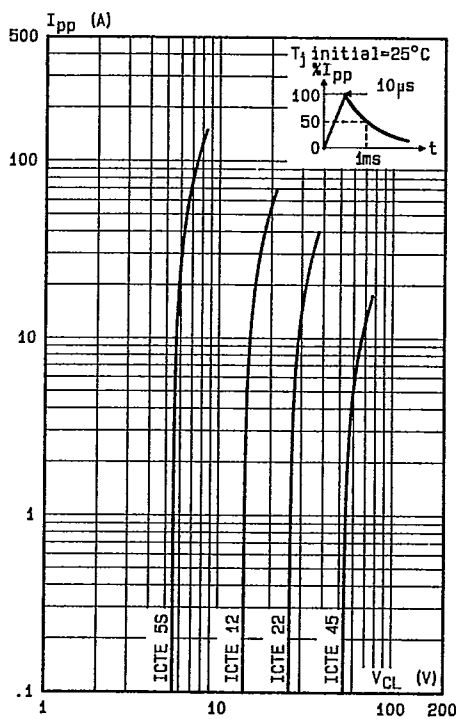
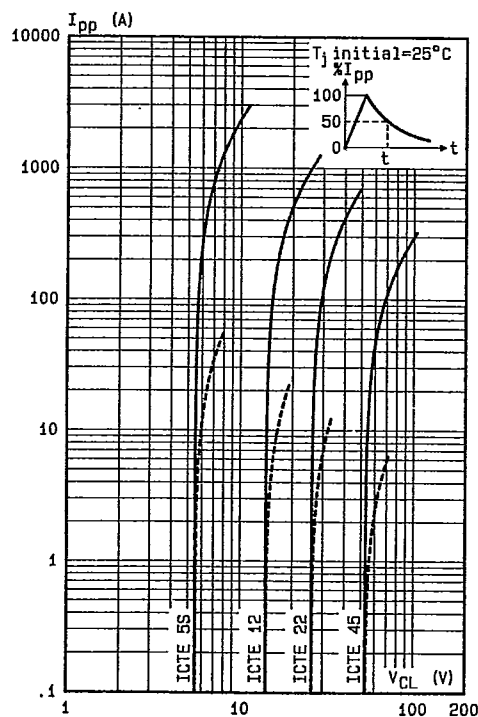


Fig. 1a-1b - Peak pulse power versus exponential pulse duration.

Fig. 2 - Peak pulse current versus clamping voltage (exponential waveform  $t=1\text{ms}$ ).Fig. 3 - Peak pulse current versus clamping voltage (exponential waveform  $t=10\mu\text{s}$  — and  $t=10\text{ms}$  ---).

Note: The curves of figures 2 and 3 are specified for a junction temperature of  $25^\circ\text{C}$  before surge. The given results may be extrapolated for other junction temperatures by using the following formula:

$$\Delta V_{(BR)} = \alpha_T (V_{(BR)}) \times [T_j - 25] \times V_{(BR)}$$

For intermediate voltages, extrapolate the given results.

## ICTE 5S, C → ICTE 45, C

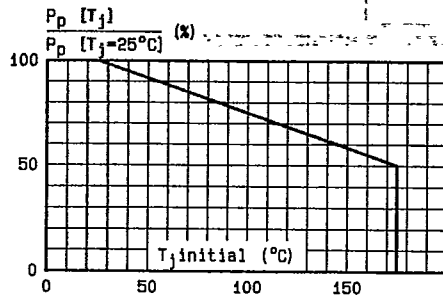


Fig.4 - Allowable power dissipation versus junction temperature.

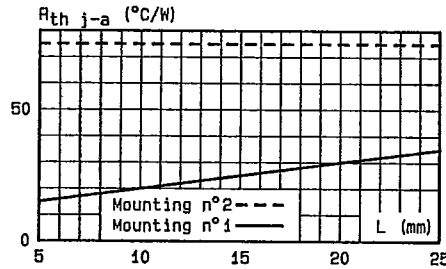


Fig.6 - Thermal resistance junction-ambient versus lead length.

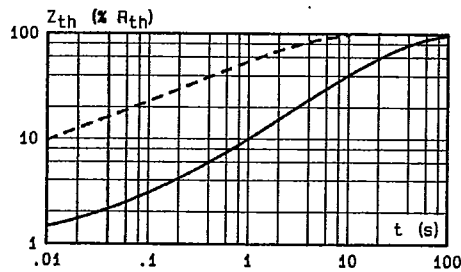
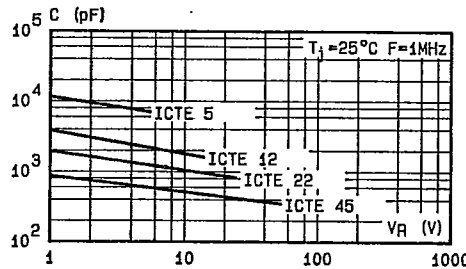
Fig.7 - Transient thermal impedance junction-connections for mounting n°1 (curve ---) and junction-ambient for mounting n°2 (curve —) versus pulse duration ( $L=10\text{mm}$ ).

Fig.9 - Capacitance versus reverse applied voltage for unidirectional types (typical values).

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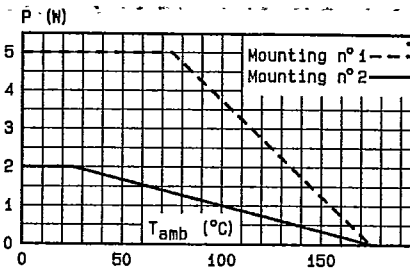


Fig.5 - Power dissipation versus ambient temperature.

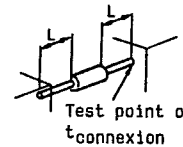
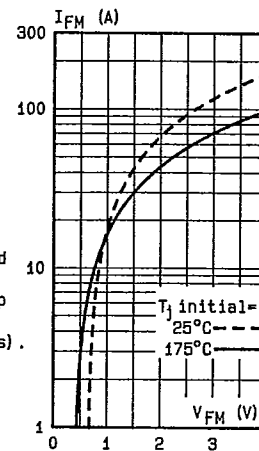
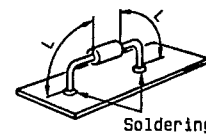
Mounting n°1  
INFINITE HEATSINKMounting n°2  
PRINTED CIRCUIT

Fig.8 - Peak forward current versus peak forward voltage drop (typical values for unidirectional types).

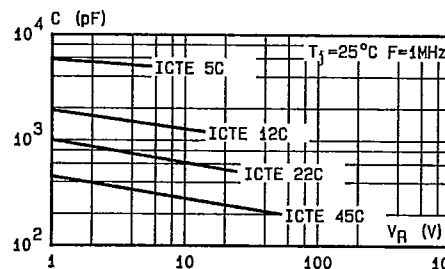


Fig.10 - Capacitance versus reverse applied voltage for bidirectional types (typical values).